

REMARKS

This amendment is responsive to the Final Office Action dated July 19, 2006. Claims 1, 2, 5 – 13, 21, 23 – 31, 33 – 38, 49, 50, 63, 66, 68 and 81 – 88 are pending in the application and have been rejected. Reexamination is respectfully requested in view of the foregoing amendments in the claims and following remarks.

In this amendment, Application has canceled claims that do not relate to Applicant's Si-diffusion blocking layer. Reexamination is respectfully requested.

In the outstanding Office Action, at page 3, beginning at line 12 and continuing line 19, the Examiner has mischaracterized Carter-Coman. Applicant respectfully traverses the assertion that there is a silicon-diffusion-blocking layer (36) suggested by or taught by Carter-Coman.

Carter-Coman has a diffusion barrier (36) which may be made of (Ni) (column 5, line 33) or titanium-tungsten-nitride (column 6, lines 65), or an oxide such as aluminum-oxide, silicon-oxide, silicon-nitride, or silicon-oxygen-nitride (column 7, lines 40 – 45) and blocks In, Pb, Au and Sn, not Si. The diffusion barrier may also be composed of nickel-vanadium (column 8, line 12).

The purpose of the diffusion barrier in '207 is for isolating the reflective layer from the solder layer such that the solder material is appreciably blocked from migrating into the reflective material (see claim 1). This is also stated in the specification at

column 5 lines 32 – 40, column 7 lines 1 - 3, lines 44 – 46, and in the Abstract. The colder layer is a group of metals such as In, Pb, Au, and Sn and not silicon.

Reference to Figure 1 shows that Figure 1 does not include a Si-diffusion-blocking layer. In fact, in Figure 1, because throughout the entire specification, there is no silicon. The disclosed silicon is tied up in the form of oxides, and functions as a barrier and is one of the embodiments of layer (36), but it does not block the flow of silicon from a silicon area to a reflective metal layer. For the Examiner's reference, Figure 2 of Carter-Coman shows ohmic contacts (32) which are an undisclosed material, a reflector which may be Ag or Au (34), a diffusion-barrier (36) a solder layer which may be In, Pb, Au, Sn, or alloys thereof as disclosed at column 5, line 38 which is also reference numeral (38). The above structures sit on an external die platform (40). External die platform (40) is described in the specification as an integrated heat sink, also known as a slug, die pad, or a lead frame to which the LED is soldered. There is no disclosure that die platform (40) is silicon (see column 5, lines 39 – 45). Only Applicant has a silicon substrate which will require a Si-blocking-layer which is claimed.

Claims 81 –88

Claim 81 recites a silicon substrate bonded on a main surface side of the compound semiconductor layer and a metal layer therebetween. This claim further recites an Si-diffusion-blocking layer having Au or Ag as a major component and containing a silicon-diffusion-blocking component which comprises two or more elements selected from Sn, Pb, In, and Ga. Carter-Coman does not disclose the silicon

blocking component claimed, and does not disclose inhibition of silicon being diffused from a silicon substrate from depositing on the reflective surface or a blocking layer with Applicant's claimed elements.

It is clear that Carter-Coman neither suggests nor teaches the claimed subject matter of claim 81. Instead Carter-Coman seeks to block the metal Applicant includes in the Si-blocking layer of claim 81.

Claims 82 – 88 are all dependent from claim 81 and, therefore, are allowable.

Claims 31, 33 – 37

Claim 31 recites a device substrate bonded on a second main surface side of the compound semiconductor while placing a metal layer in between. This substrate, as pointed out above, is not disclosed in Carter-Coman. Carter-Coman has no substrate which is silicon or anything else that can diffuse towards the reflective layer.

Claim 31 then recites the diffusion blocking layer interposed between the device substrate and the main metal layer being composed of a conductive material and provided for blocking diffusion of any device-substrate-derived components towards the metal layer. In Carter-Coman, as pointed out above, the diffusion blocking layer (36) is used to block the solder from layer (38). It is not disclosed that any substance from the external die platform (40) diffuses towards the main metal layer. All Carter-Coman ever does is prevent diffusion of solder.

In Applicant's claim 31, there is a recitation of a substrate-side contact metal layer. The metal layer in Carter-Coman is (38), but there is no substrate from which

there is diffusion which must be blocked as required by claim 31.

Claim 33

Claim 33 specifically recites that the device substrate is a silicon substrate. This is not found in Carter-Coman.

Claim 34

Claim 34 is directed to Applicant's blocking layer (610F) which is made of Ti or Ni. Nickel is mentioned in Carter-Coman. This layer is used to prevent the reflective surface from being contaminated by Au from layer 610 (see Applicant's specification page 34, line 13). 610D of Figure 22 provides the Si-diffusion blocking function.

Claim 36

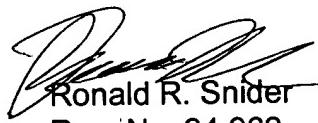
Claim 36 requires that the substrate be an n-type silicon substrate. Not only does Carter-Coman fail to disclose a silicon substrate, it does not have anything about type.

Claim 38

Claim 38, like claim 31, recites the diffusion blocking layer interposed between the device substrate and the main metal layer. Like claim 31, it also requires that device substrate drive components be blocked from diffusion towards the main metal layer.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action in accordance thereof is requested. In the event there is any reason why the application cannot be allowed in this current condition, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems by Interview or Examiner's Amendment.

Respectfully submitted,



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